

Automatic weather station supports marine research

Case Study



The client:

Ningbo Topsun Marine Technology Co., Ltd.

Vaisala solution:

Maritime Observation System AWS430

THE CHALLENGE:

Meteorological challenges in marine scientific research

Scientific Research Vessel Tan Kah Kee (R/V TTK) is a 3,000 ton, comprehensive marine scientific research vessel with a mission of "scientific research, talent cultivation, serving society and cultural inheritance in the 21st century."

From its delivery in 2017 through the end of December 2022, R/V TTK had completed 39 scientific research projects including 1,207 days of marine navigation with scientific research experiments. For example, researchers conducted real-time matching records of meteorological data and GO8050 CO₂ navigation data on board; simultaneously, stable and accurate real-time synoptic meteorological observation data were collected, which is the basis of conducting related research on the interaction between sea and air.

R/V TTK's maritime operations are concentrated in the South China Sea and the Western Pacific, where the spatial distribution and temporal changes of the synoptic system are complex, with obvious seasonal variations characteristic of marine meteorology.

Compared to the largest commercial vessels, R/V TTK can be susceptible to severe weather and sea conditions: Navigating through favorable synoptic and sea conditions is important to ensure the safe and efficient operation of scientific research activities.

In addition to standard marine and synoptic forecast resources, R/V TTK needed an onboard automatic weather station so researchers could obtain accurate, real-time atmospheric observation data and so the ship can safely

navigate through favorable weather and sea conditions.

THE APPROACH:

Modern, reliable observation data onboard

R/V TKK is equipped with the Vaisala Maritime Observation System AWS430. This automatic weather station is specifically designed to withstand the corrosiveness of the marine environment.

AWS430 successfully passed environmental, electrical, vibration and impact tests, and the testing specifications comply with Lloyd's Register and IEC60945 requirements. The automatic weather station provides accurate and reliable data on wind speed and direction, pressure, humidity and temperature, solar radiation, and rainfall to enable efficient research and safe navigation.

AWS430 weather station integrates classic meteorological sensors. Vaisala Ultrasonic Wind Sensor WMT700 is based on Vaisala's WINDCAP® wind measurement technology to ensure accurate results. Sensors are equipped with probe heating function to avoid the probe from accumulating ice and snow in cold climates. Vaisala Temperature and Humidity Sensor HMP155, equipped with HUMICAP® temperature and humidity probes, features long-term stability and endurance in harsh marine environments, as the probe heating facilitates humidity inside sensors lower than surrounding environment to reduce the risk of condensation.

AWS430 fully supports NMEA0183 and IEC1162-1 data communication requirements and can receive GPS compass signals to obtain accurate, true wind data.

THE RESULTS:

Safe navigation and efficient marine research

Marine scientific research must be conducted with atmospheric observations, and the stability and reliability of AWS430 gives researchers confidence that they can accomplish their research goals aboard R/V TKK.

Stable, accurate, and reliable real-time atmospheric observation data during navigation has been the standard matching for spot marine observation. Marine scientific research requires favorable meteorological conditions. During navigation, obtaining meteorological data is the prerequisite for meteorological research and analysis to ensure safe navigation and efficient research.

AWS430 is helping researchers on R/V TKK with reliable atmospheric observations. During navigation, the automatic weather station has operated reliably with convenient on-site maintenance.

Why Vaisala?

Weather and environmental insights are the greatest catalysts for successful maritime operations— from sensors to systems and digital services, Vaisala provides actionable insights that empower stakeholders to confidently meet challenges and harness new opportunities.

Our globally trusted maritime weather solutions enable remarkable efficiency gains, digital transformation, the protection of people and investments while supporting sustainable and responsible operations.

We are scientists and explorers driven by passion, relentless curiosity, and the desire to create a better world. Backed by 85+ years of unmatched scientific leadership, our solutions increase maritime weather awareness and drive innovation.

